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ABSTRACT

A longitudinal study called The Home-School Study of Language and Literacy Development examined the relationships between the kinds of talk that children experience at home and school at ages 3 and 4 and measures of literate abilities at age 5. Subjects, 87 children in 2 cohorts of 42 and 45 children from low-income families living in the Boston, Massachusetts area, were audiotaped during specific verbal interactions. Home visits took place when the children were age 3 and again at age 4: subjects were audiotaped as they interacted with their mothers at home and with their peers and teachers at school. Transcripts were coded for specific kinds of talk. Subjects took a battery of standardized tests at the end of their kindergarten year. Results indicated that: (1) the predictive power for later vocabulary development shifted between ages 3 and 4 from the child's ability to produce more sophisticated language at home and school to richness of talk within the environment at home and school; (2) a similar age-related shift occurred for the story comprehension measure; (3) home factors did not show predictive power for children's abilities to define a series of words; and (4) the kinds of talk that require children to remove themselves from the immediate context of interaction were essential to the development of literacy and language skills. Findings demonstrate the complementary nature of home and school factors as they influence children's early language environments. (Thirteen tables of data are included; 33 references are attached.) (RS)

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Eating, Reading, and Pretending: Predictors of Kindergarten Literacy Skills

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Introduction

Home Influences on Development

It is a well-documented finding that children from low-income families do not achieve as well in school as their middle-class peers (Coleman, Campbell, Hobson, McPartland, Mood, Weinfeld, and York, 1966; National Assessment of Educational Progress, 1981, 1985), with the gap between the reading abilities of children of different socioeconomic status groups expanding as the children advance through grade levels. The blame for this disparity in school achievement has often been leveled at parents, particularly mothers, for their style of interaction with their children.

Bernstein (1962, 1972) has posited that middle-class ways of talking with children support literacy development, while working-class ways of talking inhibit it. According to Bernstein, language constrains what and how a child learns, forming a basis for future learning. Studying families in Britain, Bernstein posited that children from working-class families were victims of restricted codes, styles of talk that are specific to the current physical context. These codes are limited, stereotyped, condensed, inexact, and nonspecific. Restricted codes lack precision and specificity. Sentences are short and syntactically simple. On the other hand, middle-class families, while using restricted codes in some situations, also use elaborated codes, in which the communication is not specific to the particular situation or context. It is more differentiated and more precise, and thus affords the opportunity for more complex thought.

According to Bernstein, early experience with codes is a powerful determining factor for later cognitive structures and modes of communication. The major result of exposure to restricted codes is to limit the scope and detail of the concepts or information available to the developing child. Children exposed exclusively to restricted codes have difficulty in school because "the different focusing of the experience through a restricted code creates a major problem of educability only where the school produces discontinuity between its symbolic orders and those of the child. Our schools are not made for these children; why should these children respond?" (1972, p. 173). These children, in his view, are not properly equipped to handle the elaborated codes of schools.

Bernstein attributes differences in style of sociolinguistic interaction in the family to varying strengths in boundary maintaining procedures, which describe the hierarchical relationships within a family. In a person-centered family, talk is major means of control over other family members, because of constant adjustment of behavior by family members to others' verbally elaborated motives and intentions. A person-centered family uses elaborated codes in order to change the behavior of the child, i.e., the child learns behavior rules through elaborated discussions of a specific context, the rationale of a specific rule, and consequences of alternative actions. In the status-oriented or positional family, members respond to formal rules of behavior and status roles. The use of restricted codes is indicative of this kind of family structure. In order to teach the child appropriate behavior, parents simply state the rules and the appropriate roles family members should fill. Status-oriented parents simply give commands and invoke rules, while person-oriented parents give explanations for commands and rules, allowing the child to broaden her understanding of social structures, behavioral consequences, and human motives.

Bernstein's theory has spawned a great deal of research on social class differences in language. His own research (1962) indicated that middle-class speakers use more complex syntactic constructions (especially subordinate constructions) than do working-class speakers, and that working-class speakers use more vague or indefinite expressions (especially second and third person pronouns). These findings have been replicated in Britain, Australia, Israel, Europe, and the United States (see Hemphill, 1986, for a review of relevant literature). Hemphill has criticized this research on the grounds that, while there appear to be robust social class differences in sentence construction and pronoun use, these differences cannot be explained by the family structures that Bernstein proposes. It is not clear how weak boundary maintenance procedures would lead to very specific differences in sentence structure, such as more frequent use of first-person pronouns and subordinate clauses.

Hess and Shipman (1965), working in the United States, came closer to addressing more directly the links between parental talk and potential cognitive outcomes. Their comparative study of urban African-American preschoolers of different social classes indicated that low-income mothers used simpler, less challenging talk with their children than did middle-income mothers when teaching their children how to perform a sorting task (new to both the mother and the child). The working-class and welfare mothers tended to give many commands without rationales, and did not plan their teaching strategies. Middle-class mothers were more explicit in their directions and explanations. Middle-class children performed the task more successfully and were better able to verbalize the sorting principle. Hess and Shipman concluded that lower-class maternal style predisposed children to be compliant to authority, but not reflective about their performance of the task. These children were subjected to cultural deprivation, "deprived of meaning" as a result of living in "a cognitive environment in which behavior is controlled by status rules rather than by attention to the individual characteristics of a specific situation and one in which behavior is not mediated by verbal cues or by teaching that relates events to one another and the present to the future" (p. 885).

Both of these perspectives present a deficit view of low-income families and the development of children from these families. The terminology used to describe the findings is heavily value-laden; the terms cultural deprivation and restricted code give the reader a sense of pathology. The tasks used in the Hess and Shipman study were biased towards middle-class styles of performance and did not portray low-income parents in the best light. It is likely that in other settings and with other tasks, parents of low-income children can provide more challenging, more cognitively meaningful talk.

Despite the problems with their approaches, there is some merit to the arguments of Bernstein and Hess and Shipman. The interaction that takes place between parent and child can have clear consequences for the child's development. What needs to be done is to establish more direct theoretical connections between precursors and outcomes, instead of linking large, amorphous variables like social class to specific cognitive and linguistic outcomes.

One such enterprise is Sigel's parental distancing model (Sigel, 1981), that predicts that the kind of verbal exchanges parents engage in with their child is associated with the child's cognitive development. Parents who speak to their child in a manner that demands that the child "separate him/herself mentally (via representation) in space or time from the ongoing observable field" (p. 206) are facilitating cognitive development in their child. These distancing strategies vary in level of demand or in their ability to "transcend the ongoing present" (Sigel and McGillicuddy-DeLisi, p. 77). High-level distancing strategies include drawing conclusions, inferring cause and effect relationships, planning, evaluating consequences, and evaluating affect. Low-level distancing strategies include labeling, producing information, and observing. Sigel hypothesized that the use of high-level distancing strategies by parents would result in a child's ability to think representationally: anticipation (planning and predicting, focussing on the future), hindsight (memory reconstruction and associative memory, recall of past events), and understanding the rules that experience can be represented in a medium other than the original (e.g., words, drawing, photographs).

In a study of low- and middle-income families, Sigel (1982) found correlations between four-year-olds' representational thinking and both mothers' and fathers' use of high distancing strategies, even when controlling for socioeconomic status. He also found differences in performance across tasks and in the predictive power of different tasks on cognitive outcomes. These findings indicate that Bernstein's and Hess and Shipman's views are oversimplistic; there are a wide variety of interactional environments in which children grow up and a broad range of cognitive and linguistic outcomes, even within a single social class.

The work of Snow and colleagues has also attempted to demonstrate clear relationships between how parents talk to children and later developmental outcomes (Snow, in press; Snow and Dickinson, 1987). Snow has studied what she has termed decontextualized talk, in which the

audience is at a distance, physically and/or socially, from the speaker and shares only limited knowledge with the speaker. However, her research focusses on these types of talk between parents and children as predictors of the development of a relatively specific set of literacy and discourse abilities, monologue skills such as narrating, explaining, and describing. These skills, in both oral and written form, are necessary for success in school, and their development is believed to be facilitated by social interaction of specific kinds between parents and children. It is Snow's contention (Snow, in press) that oral language is not a single ability, but that different skills are developed in different contexts for different purposes. These different purposes and skills are then differentially related to outcomes like oral monologue skills, reading, and writing. For example, Dickinson and Tabors (in press) and Beals, De Temple, Tabors, and Snow (1991) reported positive correlations between exposure to narrative talk in family mealtimes at age 4 and story comprehension at age 5.

A common thread. A common thread runs through the theoretical perspectives of Bernstein, Sigel, and Snow: the issue of talk that distances the interlocutors from the current context, making connections with some other place or some other time. This kind of talk is more explicit, clarifying some sort of connection for the audience. According to these theories, this elaborated, distancing, or decontextualized talk used between child and parent predicts some cognitive or linguistic outcome. These outcomes are crucial to a child's success in school. What remains to be seen is what specific types of distancing or decontextualized talk between children and their parents have this facilitative effect on language, literacy, and cognitive ability.

School Influences on Development

It used to be possible to restrict research on children's early linguistic and cognitive development to interactions in the home between parent and child. This is no longer the case. The continuing economic and social realities faced by most Americans have resulted in a dramatic increase in the numbers of three- and four-year old children who spend a significant amount of time in out of home care (Bredekamp, 1987). Given this fact, it is imperative that we account for the possibility that interactions in preschool classrooms exert some influence on children's development; similar to or different from the patterns observed in homes.

Historically, research that has related preschool factors to children's later development has concentrated on "macro-level" variables such as group size, teacher-child ratio, or overall program philosophy (e.g. direct-instruction versus developmentally-based) (Consortium for Longitudinal Studies, 1983). Investigation of "micro-level" factors such as verbal interaction have only recently become the subject of specific inquiry. Thus, in contrast to the body of information about parent-child interaction, there has been little research at the preschool level which connects verbal interaction with children's later language or cognitive performance.

Interaction in preschool classrooms. One body of literature focussing on the preschool level has attempted to describe specific curriculum or interactional strategies that might encourage children's language development (see Cazden, 1988 for review). Common suggestions include providing rich and varied materials, structuring activities to promote verbal interaction, avoiding drills and recitations, and accepting all input from children. The National Association for the Education of Young Children, in its program guidelines for appropriate practice describes an optimal language climate for preschoolers as follows:

> Adults provide many and varied opportunities for children to communicate. Children acquire communication skills through hearing and using language, and as adults listen and respond to what children say. Children do not learn language, or any other concepts by being quiet and listening to a lecture from an adult. (Bredekamp, 1987, p. 10)

While many of these suggestions are in accord with our knowledge about language development, cognitive development, and what occurs in homes, two difficulties remain. First, the grouping together of so many attributes does not allow us to isolate or predict which specific interactional features might directly influence children's later development. Second, although the implications of the suggestions seem clear, research on preschool classroom interaction has not yet connected input with outcomes. Thus, while the desire to suggest interactional strategies for preschool teachers is well-intentioned, it is limited by the generality of the suggestions and the lack of established connections between teacher-child interactions and later child outcomes.

A second body of literature on preschool classroom discourse has tried to document general stylistic differences among preschool teachers (e.g., Dickinson & Keebler, 1988; Smith & McCabe, under review; Tizard & Hughes, 1984; Wells & Wells, 1986). This research direction has yielded much more specific information about the types of interaction that regularly occur in preschool classrooms. There are several documented differences among teachers which reflect the type of activity in which they are engaged. During formal lessons and large group interactions, teachers often engage in a consistent language routine in which the teacher initiates interaction, a student responds, and the teacher provides evaluation of the response (Cazden, 1988; Kleifgen, 1990; Mehan, 1979). During free play periods, preschool teachers' talk with children varies depending on whether the teacher is stationary or circulating (Dickinson, 1991), whether the activity is goal-directed by the teacher (Smith & McCabe, under review), or whether the teacher is an active participant in children's symbolic play (Morrow, 1990; Schrader, 1990).

While these findings are much more specific than the classroom strategies described earlier, their potential implications have not been directly investigated. It is possible, however, to speculate on their potential effect on children's language use. For example, Dickinson (1991) asserts that when teachers remain stationary with a small group of children, they are more likely to engage children in extended, cognitively challenging discourse (Snow's decontextualized talk) -- the kind of talk that, in homes, has been shown to be positively related to later outcomes. Also, Morrow (1990) hypothesizes that when teachers become active participants in children's symbolic play by providing "literacy" materials (e.g. writing implements, paper, books) and guidance on their use, children display more literacy behaviors which might be linked to subsequent academic performance. During group book reading in preschool classrooms, teachers tend to adopt a consistent style which either encourages or discourages children's verbal participation (Dickinson & Keebler, 1988; Dickinson & Smith, under review), exposing children to very different models of how to take information from books and how to participate in a significant literacy event, perhaps linking early attitudes with later literacy development.

For the most part, it is left to the reader of this research to ponder the implications of such stylistic differences on children's language, literacy, or cognitive development. However, a small body of research on book reading in preschool classrooms has demonstrated connections between book-related talk and children's early literacy development (Dickinson & Smith, under review; Feitelsen, Goldstein, & Iraqi, under review; Karweit, 1989; Morrow, 1984). In a recent extension of the current work on preschool book reading practices, Dickinson and Smith demonstrated differential effects of teachers' reading styles on children's later academic performance. Specifically, when preschool teachers read in a Co-constructive manner - pausing frequently during the book reading to ask analytic questions and to accept children's spontaneous input, or when teachers read in a Performance manner - with analysis of the text occurring during a follow-up discussion, children scored significantly higher on a test of vocabulary development and story comprehension a full year later.

Home and school together. When taken together, all of the research traditions and investigational results described above point to a need for more specific examination of the multiple factors and diversity of interactional contexts that may influence and predict children's early language and literacy development. We agree with Snow's contention that there are multiple skills relevant to early language and literacy development, and believe that home and school contexts

both contribute to the development of these skills. We expect to find specific kinds of interaction in either home or school (or in both contexts) that support the development of early oral language and literacy skills.

How do interaction at home and interaction at school influence the overall literacy development of children? Are they additive, with home and school contributing something different but complementary to development? Are they overlapping, with both environments potentially providing essentially the same influences, compensating when there are gaps in one of the settings? Or are they independent, with the opportunities and outcomes of each setting entirely different?

In this paper, we will examine the relationships between the kinds of talk that a child experiences at home and school at ages 3 and 4 and measures of literate abilities at age 5. We will describe the predictor and outcome variables, outline their relationships, and interpret these relationships in light of the kinds of social interaction that the child takes part in.

Methods

The Home-School Study of Language and Literacy Development (Snow and Dickinson, 1987; Snow, Dickinson, and Tabors, 1989) is a longitudinal study that is investigating children's early language environments as predictors of later literacy development. The primary goal of the project is to identify types of social interaction that facilitate a child's development of a specialized set of language and literacy skills. As outlined above, we believe that there are many interactional factors and multiple contexts of interaction which influence the development of these skills.

Subjects. The subjects for the Home-School Study are 87 children (in two cohorts of 42 and 45 children, respectively) from low-income families living in the Boston area. They were recruited through Head Start and other daycare programs. Approximately ten to twenty percent of the parents in each school then volunteered to participate in the study. Subjects were accepted for the study if they qualified for admission to Head Start programs (eligibility is based on the family's income level) and if English was the predominant language spoken in the home. Of these children, 35.6 percent (31) were minority children. At the present time, only data on the Cohort 1 has been analyzed.

As in all longitudinal studies, some attrition has taken place. Four subjects from Cohort 1 have left the study. Two families chose not to continue in the study after the first home visit. Following the second home visit, another family decided to withdraw and one family moved out of state. Low-income families were chosen as subjects in the larger study for several reasons. First, similar data have been collected on middle-class samples in many other studies, so we have a reasonably clear portrait of middle-class children's language environments and later literacy development. Less is known about the environment of children from low-income families. Second, Snow, Dickinson, and Tabors sought a sample with a wide range of abilities, performances, and outcomes. Because children from low-income families represent a wide variety of homes, support structures, and subcultures, we would expect broad variation in performances on the tasks.

Data collection. Data collection for the Home-School Study entailed yearly visits to subjects' homes and preschools in order to collect observational data and elicit specific types of talk between child and mother, or child and teacher. Home visits took place when the target children were age 3 and again at age 4. During each visit, the mother and target child were asked to perform a number of tasks together while an experimenter audiotaped the verbal interaction and took context notes. These tasks included the mother reading two books (Very Hungry Caterpillar, by Eric Carle, and a book of the child's choice) to the child and eliciting from the child a recount of some interesting event they both attended. The mother was also interviewed to obtain background information on the child and family. At the end of the session, the experimenter left a blank tape and tape recorder with instructions for taping a mealtime conversation. The mealtime was

taperecorded without the experimenter present.

Target children's preschools were also visited by experimenters in order to observe the kinds of exposure to literate activities and social interaction that the children received. These visits occurred at approximately the same time as the home visits each year. Experimenters interviewed the head teacher in order to ascertain her pedagogical orientations and the regular routines and curriculum of the classroom. They used observational checklists that provided information about the current classroom design and curriculum. They also collected audio- and videotapes of children's conversations with peers and with teachers. Teachers were asked specifically to engage the target child in a conversation about a recent past event (similar to the home data collection) and to read a book to the class at some point during our visit. It is important to note that the book reading request was not a significant departure from the regular routine of these classrooms.

Towards the end of their kindergarten year, target children were given a battery of standardized tests and asked to perform a set of independent language tasks. This collection of tasks was intended to assess a host of language and cognitive skills. Among these measures were the Peabody Picture Vocabulary Test (PPVT), a standardized test of receptive vocabulary. This test is commonly used as a measure of a child's receptive language and is known to be correlated with verbal intelligence tests and school achievement. A story comprehension task, in which the experimenter read the children's book Snowy Day, by Ezra Jack Keats (1962) and asked a series of questions, tapped the child's world knowledge and inferential ability. A child's score on this task was the number she answered correctly (out of 13 questions). A definitions task, in which the child was asked to give definitions of 14 nouns, was administered. These definitions were rated on how formal they were (inclusion of a superordinate category with a relative clause; e.g. "a thief is a person who steals"). We recorded each child's proportion of definitions that were formal.

Transcription and coding. All recorded conversations from home and school were transcribed into computer files according to Codes for the Human Analysis of Transcripts (CHAT) conventions for analysis by the Child Language Analysis (CLAN) software available through the Child Language Data Exchange System (CHILDES) (MacWhinney and Snow, 1990). Transcripts were then coded for specific kinds of talk.

Predictor Measures from Different Tasks and Settings

Elicited reports at home. During the home visit, mothers were asked to elicit a report of an event that the child had participated in. This was a fairly constrained activity in which mothers generally suggested an event that both had attended and then asked the child a series of questions about the location, participants, and major occurrences in order to get the story told to the experimenter.

The transcripts of these conversations were coded for the give and take of information between mother and child. Mothers generally asked questions of the children, leading them through the telling. Example 1 is a typical elicited report.

Example 1

*Mother: tell me something.
*Mother: remember what we did Sunday?
*Mother: where did Mommy take you?
*Mother: Sean got to go on the boat.
*Mother: where did we go?
*Mother: all by yourself.
*Brian: sprink.
*Mother: sprinklers.
*Mother: and what did we do there?

*Brian: go in the sprinkles?
*Brian: on a swing?
*Mother: on the xxx swings.
*Mother: on the sprinklers.
*Mother: and what did we have there?
*Mother: what did we also we get?
*Mother: before we went there?
*Mother: did you get your lunch?
*Brian: (nods)
*Mother: what did you get for lunch?
*Brian: hamburgers.
*Mother: from where?
*Brian: from MacDonald's.

(continues)

An information index was created, representing the ratio of the number of times the child gave information (both responding to questions and spontaneous comments) to the mother's requests for information. An information index of 1 indicated that the child provided information that was requested by the mother's questions and did not add more. An index greater than 1 indicated that the child was spontaneously providing information beyond that which was requested by the mother. An index smaller than 1 meant that a mother was making more than one request in order to elicit one response from the child. In addition, the child's number and proportion of utterances in which she gave information spontaneously were recorded. Table 1 displays the means and ranges of these measures for the full cohort.

Table 1
Elicited Reports Variables

Variable	n	Mean	SD	Range
Information Index (age 3)	37	0.76	0.65	0-3.50
Information Index (age 4)	37	0.85	0.70	0-3.00
Child Spontaneous GI's (age 3)	37	3.78	3.97	0-15
Child Spontaneous GI's (age 4)	39	4.59	6.73	0-26
% of Child's GI's Spont. (age 3)	34	30.8	24.8	0-83.3
% of Child's GI's Spont. (age 4)	38	28.2	29.9	0-100.0

At both home visits, the mean information index was below 1, indicating that children tended to give less information than the mothers requested, requiring the mothers to prompt the children repeatedly or to change questioning strategies in order to get a response. Mothers could simply repeat a question or they could reduce the level of demand on the child in asking the question, moving from an open-ended questions (e.g., "what did we do yesterday?"), to a more specific question (e.g., "what did we do at the park yesterday?"), to a yes-no question (e.g., "did we play on the swings?"). Some mothers had to use this stepping-down strategy in order to get a response from the child. In one case, the mother simply nominated a topic and the child reported the entire event with little or no help from the mother. This child is represented in the high end of the ranges in all three variables at the second home visit.

Home bookreading. Home bookreading conversations were necessarily shaped and directed by the mother. Most mothers used a style of asking questions at intervals throughout the

reading of the text. We were particularly interested in the types of questions that mothers chose to ask.

Bookreadings were analyzed for the content of the talk. Each utterance was coded to indicate whether the comments and questions were immediate or non-immediate. Immediate talk was language that was restricted to what the mother and child see before them in the immediate physical context (i.e., the book). In non-immediate talk, the mother and child move away from what can be seen on the page, such as thoughts and analyses about the character's motivation or spontaneous connections to the child's own world. This category includes "why" questions and predictions. It is believed that this type of talk, because it is more explicit and less reliant on shared context, reflects the skills that will be required in school for later successful literacy and school achievement. Example 2 contains numerous non-immediate utterances by both mother and child.

Example 2

*Ethan:	why she going to eat Hansel and Gretel?
*Mother:	because she was hungry.
*Ethan:	why was she hungry?
*Mother:	because she didn't have any food.
*Ethan:	but that's not food.
*Mother:	I know it's not food.
*Mother:	but she was a mean old witch and she ate little girls and boys.
*Ethan:	but [/] but there's no [/] the witch in here.
*Mother:	there's a witch in this book.
*Ethan:	not in here.
*Mother:	yeah [/] no not here!
*Mother:	there [/] witches are only make believe.
*Ethan:	but I like 'em.

Table 2 presents the amount of non-immediate talk by the mothers, the percent of non-immediate talk during the reading of the book by both mothers and children, and the information index (computed in the same manner as the elicited report index), for both the unfamiliar (experimenter-provided) and familiar books, at both home visits.

There is a trend towards a higher proportion of non-immediate talk when the children were four. Although the proportional amount of non-immediate talk seems to increase with the older child in the reading of both types of books, the actual number of utterances of this type by the mother only increased slightly with the book of choice. When the mother read Very Hungry Caterpillar the second time, she seemed to use less non-immediate talk. The higher proportion maybe accounted for by an overall decrease in the amount of talk during reading from age 3 to age 4. A slight increase occurred when mothers and children read their own book together. The actual numbers, however, are a reminder of how rarely this type of talk occurs even with a familiar book. Although the children were older than four and a half years old at this visit, more than 80 percent of the talk about the book is either irrelevant to the content of the book or about concrete, immediately available information. The skills of the child that enable talk about the past, the meaning of words, interpretations of motives or feelings are being tapped less than 20 percent of the time.

The information index suggests that with the new (unfamiliar) book children do little more than answer their mothers' questions. Although the book is somewhat more familiar at the second home visit and many children reported reading it at school, their involvement does not increase. However, the favorite book triggers twice as much talk from the three-year-old than the new book and somewhat less for the four-year-old.

Table 2
Book Reading Variables

Variable	n	Mean	SD	Range
% of Non-Immediate Talk Book V (age 3)	39	10.5	7.3	0-23.8
% of Non-Immediate Talk Book V (age 4)	37	12.7	10.1	0-37.5
% of Non-Immediate Talk Book X (age 3)	39	10.4	9.8	0-41.2
% of Non-Immediate Talk Book X (age 4)	38	16.1	15.0	0-42.9
# of N-I Utterances by Mother V (age 3)	39	4.4	3.6	0-12
# of N-I Utterances by Mother V (age 4)	37	3.8	3.4	0-15
# of N-I Utterances by Mother X (age 3)	39	4.4	5.6	0-24.0
# of N-I Utterances by Mother X (age 4)	38	5.1	6.4	0-28
Information Index Book V (age 3)	38	1.4	1.1	0-4.0
Information Index Book V (age 4)	36	1.6	1.2	0-5.0
Information Index Book X (age 3)	39	3.1	5.1	0-29.0
Information Index Book X (age 4)	38	2.7	4.2	0-21.0

V Very Hungry Caterpillar
X Book of choice

Home mealtime conversations. Mealtime conversations provided a source of more naturalistic talk between mother and child, and among other family members as well, giving us the opportunity to listen in on the patterns of interaction among family members. Because experimenters were not present for the mealtime conversations, we had to rely on families to follow through on this activity and return tapes to us. Only 27 families returned tapes after the first and second home visits each. Mothers were aware of our interest in the target child, so they often made a concerted effort to draw the child into the conversation.

Conversations were coded for the presence of narrative talk and explanatory talk by all family members. Talk was coded as narrative when the topic was a past or future event. Explanatory talk sought to clarify some logical connection between objects, events, concepts, or ideas made clear. We hypothesized that exposure to narrative and explanatory talk will support the development of a child's discourse abilities, skills that are crucial for school success. Example 3 is a sample of narrative talk in one family at the first home visit, and Example 4 contains an explanation that occurred in another family at the second home visit.

Example 3

*Elaine: Darcy know what?
*Elaine: they made me look in Scott's yard.
*Elaine: know what they saw under the table?
*Darcy: what?
*Elaine: a dead mouse.
*Todd: and we saw the blood!
*Elaine: and the heart.
*Mother: okay okay we're eating.
*Elaine: no!
*Elaine: we only saw the heart.
*Mother: yeah Elaine.
*Darcy: oh.
*Elaine: I hated it.

Example 4

*Karin: Sally had gym today.
*Mother: Sally had gym?
*Karin: uhhuh.
*Karin: 'cause I saw her coming out of the gym.
*Mother: oh you did?
*Karin: mmhm.

We recorded how much of the narrative talk and explanatory talk that each family member, especially mothers and target children,was responsible for. This was computed as a percentage of the narrative or explanatory talk (in number of utterances that the individual produced) within mealtime conversation.

Table 3 presents the means, standard deviations, and ranges of the frequency and proportion of mealtime talk that is narrative in nature, the frequency and proportion of mealtime talk that is explanatory, and the proportion of the explanatory talk that is produced by the target child, the mother, and the father (if present) for each home visit.

Table 3
Mealtime Variables

Variable	n	Mean	SD	Range
# of Narratives (age 3)	23	4.52	3.25	1-15
# of Narratives (age 4)	21	4.19	2.67	1-11
% of Narrative Talk (age 3)	23	17.9	13.1	1.1-42.7
% of Narrative Talk (age 4)	21	11.9	7.4	0.2-30.6
# of Explanations (age 3)	27	16.8	13.2	2-45
# of Explanations (age 4)	27	15.0	8.1	0-27
% of Explanatory Talk (age 3)	27	17.2	8.2	3.4-30.7
% of Explanatory Talk (age 4)	27	15.3	8.4	0-35.1
% of Exp. Talk by Child (age 3)	27	27.5	14.4	0-50.5
% of Exp. Talk by Child (age 4)	27	29.7	14.5	0-66.7
% of Exp. Talk by Mother (age 3)	27	47.3	17.1	13.3-91.7
% of Exp. Talk by Mother (age 4)	27	47.0	13.5	21.4-73.8
% of Exp. Talk by Father (age 3)	14	15.7	16.0	0-48.3
% of Exp. Talk by Father (age 4)	11	17.3	11.4	0-33.7

There are roughly equivalent amounts of explanatory and narrative talk, on average, in both the first and second mealtimes. Children, even at ages 3 and 4, are very involved in explanatory talk, contributing 27.5 and 29.7 percent of the utterances in segments of explanatory talk. On average, fathers are infrequent contributors to mealtime explanations, as reflected in Table 3, and in mealtime conversations overall.

Bookreading at school. School bookreading situations were quite different in character from those at home. The book was read to a large group of children, rather than one child. Thus, group management was necessarily a prominent feature of school book readings, especially directly before the actual reading began. However, most teachers would pause during the reading to ask questions of the children, to elicit their personal reactions, or to allow them to "chime in" on familiar portions of text, similar to some of the patterns observed in the homes. Interaction during the school bookreadings were coded for many of the same categories of talk as were the home

bookreadings (Dickinson, De Temple, Hirschler, & Smith, in press). In addition, an extended coding system was developed that described more specific categories of talk (Dickinson & Smith, under review). In both home and school contexts, however, we were especially interested in interactions that required children to move beyond the text in their responses (coded as non-immediate talk for the three-year-old school bookreadings and as analytic talk in a more specific coding scheme for the four-year old book readings). The interactions that typified this kind of talk (analytic talk) required the child to analyze characters' personality traits and motivations, to speculate about causes for behavior or incidents, to predict upcoming events, and to directly discuss vocabulary. Example 5 occurred in a four-year-old classroom and points out children's spontaneous analysis of text and pictures. Example 6 illustrates a teacher's efforts which help children analyze vocabulary.

Example 5

(The class is reading Mercer Mayer's There's A Nightmare In My Closet. The teacher has just pointed silently to one of the pictures.)

*Jed:	he's sad, he's sad.
*Teacher:	why do you think he's sad Jed?
*Jed:	he's sad because he wants the teddy bear.
*Teacher:	you think so?
*Jed:	yeah.
*Teacher:	but how can you tell he's sad?
*Jed:	by his face.
*Teacher:	oh, his face is telling you?
*Jed:	(nods in agreement)

Example 6

(The class is reading a simple rhyming book entitled Fred and Ted.)

*Teacher:	(read text -- "...we can walk and talk".)
*Sue:	walk and talk.
*Teacher:	do you hear lots of rhyming sounds in there? rhyming words?
*Sue:	yeah.
*Teacher:	listen: "let's take a walk and talk". here's one, "we can walk and talk". which sounds rhyme?
*Sue:	talk and walk.
*Teacher:	talk and walk.

Both of these examples demonstrate teachers' willingness and childrens' ability to analyze texts in a sophisticated manner that moves beyond the immediate context of the book and the book reading event. (Note that these are classroom variables, not individual child variables.)

Table 4 indicates that during both school visits teachers tended to make more non-immediate comments than children, not surprising given the greater amount of talk by teachers in these classrooms. However, a greater proportion of children's talk was made up of non-immediate comments than teachers' talk. This is because teachers did more different kinds of talk in setting up the bookreading situation (e.g. behavior management), so their proportion of non-immediate talk is lower. Children's non-immediate comments were both spontaneous and prompted by the teacher. The table also suggests that there is an age-related trend towards both teachers and children making more non-immediate comments in the 4-year old year. (This change was

significant for teachers $t(38) = -2.20$, $p = .03$). Thus, across a number of preschool classrooms, we see that children make proportionally more non-immediate comments than teachers and that the number increases with children's age.

Table 4
School Book Reading Variables (by Classroom)

Variables	n	Mean	S.D.
% Teacher Non-imm (age 3)	19	14.24	16.04
% Teacher Non-imm (age 4)	25	22.81	17.71
# Teacher Non-imm (age 3)	19	5.53	8.87
# Teacher Non-imm (age 4)	25	9.60	9.79
% Child Non-imm (age 3)	19	19.90	14.08
% Child Non-imm (age 4)	25	33.16	24.75
# Child Non-imm (age 3)	19	3.58	4.25
# Child Non-imm (age 4)	25	7.68	7.94

Pretend play at school. We also recorded and observed the child's talk during free play situations at school. We then catalogued the child's talk and coded it for general talk types. One type of conversation of particular interest was pretend play because it is within the context of pretending that children suspend their current reality and move beyond the limitations of time, space, and character. The kinds of talk that occur during pretend play episodes are reflective of these shifts in perspective, and are types of decontextualized talk. We computed the proportion of time children spent in pretend play during our observation samples at age 3 and age 4 for use in the present analysis. Example 7 is a segment of interaction from one child's 3-year old school experience that shows the negotiation of pretend play while Example 8 demonstrates children engaged in decontextualized talk during pretending.

Example 7

*Remo: Eddie, you wanna play Rambo?
*Eddie: no, I'm playing Cricketman
*Remo: hey, hey, when we get outside how 'bout we play Spiderman and Iceman okay?
*Eddie: okay. Here's your cricket.
*Remo: that's a different cricket.
*Eddie: come on let's go get more things.
*Remo: yeah.
*Eddie: we gotta build a home for him.

(The boys begin to gather blocks and other materials.)

*Eddie: yeah, 'cause that's my favorite buddy pal, because now we're playing together.

Example 8

(The boys are playing with small figures of crickets and bugs, they often pretend that there are enemy attacks which destroy the habitats they have created, they also discuss what constitutes a hero.)

*Eddie: but you know what?
*Remo: what?
*Eddie: one day he'll show that he's a real hero
*Remo: no, he's too scared, he wants to go back in.
*Eddie: some day mine is gonna be a superhero 'cause he's gonna make up a formula, one day mine's gonna be a superhero.
*Remo: [sound effects]
*Eddie: he's out in his picnic table and he's gonna make a formula to make something come alive for us.
*Remo: no, I have to make a formula, to make me a superhero.
*Eddie: here's your picnic table.
*Remo: [in his "character" voice] lookit, I'm a superhero, [singing now] superhero!
*Eddie: nnnn, no, that's not the right formula.
*Remo: why not?

(Eddie wants to control which formula "counts" and offers his to Remo)

*Eddie: he left some for you, he left some for you, oh superbug.
*Both: superbug!
*Eddie: now we're both good, we'll fight evil.

As the examples demonstrate, there are multiple agendas involved in children's pretending that require sophisticated use of language. Negotiation, redirection, scene setting, and scene enactment all require the children to move beyond the present conversational context and to specify their roles within the pretending context.

Children varied widely in the proportion of time they choose to engage in pretending talk at school (see Table 5). Although the percentages of time that children spent in pretending were small on average during both the three- and four-year old visits, the language that occurred in these brief episodes was rich and varied.

Table 5
Proportion of Pretending Talk During School

Variables	n	Mean	S.D.
% Time Pretending (age 3)	39	6.29	8.79
% Time pretending (age 4)	35	7.62	12.95

Analysis and Results

Our major purpose is to tease out links between early language environment and later school success. In order to observe more specific relationships between skills, we treated the data collected at home and school visits at ages 3 and 4 as predictor variables, and the tests and tasks at age 5 as outcome variables. Although the children are only five years old, the outcome variables

are either standardized tests shown to be correlated with school success (PPVT) or tasks similar to the kinds of tasks required in schools (story comprehension and giving formal definitions). Using multiple regression analyses, we built models for predicting performance on the PPVT, the story comprehension task, and the formal definitions task. Building models in this way allowed us to ascertain the presence and nature of relationships among home and school predictors and outcome variables.

Predictors at Age Three

Predicting PPVT. Because there were two different books used for the home bookreading (Very Hungry Caterpillar and a book of choice), we created a composite of the proportion of talk about each book that was non-immediate using principal components analysis. Also using principle components analysis, another composite was created, combining proportion of time spent in pretend play, and proportion of time the child spent in interaction with others (these two were highly correlated because children spent most of their free time playing with other children). These composites were then included as predictor variables for PPVT scores (see Table 6).

Table 6
Regression Models for Predicting PPVT Scores (Predictors at Age 3)

Model	School Pretend ß	Home BR Non-Imm ß	R^2	d.f. Error	Increment to R^2
I	6.54****	---	.410****	27	---
II	---	6.93****	.292****	38	---
III	6.07****	6.07****	.652****	25	.252****

**** $p < .0005$

Children's performance on the PPVT at age five was predicted by both the amount of talk around pretend play done by the child in preschool at age three and the amount of non-immediate talk that took place in the home bookreading situation at age three. Controlling for the proportion of non-immediate talk in home bookreading, children who did more talk in pretend play situations scored higher in the PPVT on average. Controlling for proportion of pretend talk with others at school, children who participated in more non-immediate talk in bookreading at home also received higher receptive vocabulary scores on average.

Together these two predictors accounted for 65 percent of the variation in PPVT scores. There was no interaction between the two predictors. The tolerance statistic for the two predictors was very high (.99), indicating that the predictors were independent (there was no problem with multicollinearity).

Predicting story comprehension. The pretend talk composite also turned out to be a predictor of performance on the story comprehension task. The child's contribution to the elicited report (as measured by the elicited report information index) was also a predictor (see Table 7).

Controlling for the home elicited report index, children who did more pretend talk with others in school at age 3 scored better on story comprehension on average. And controlling for proportion of pretend talk, children who carried more of the load in the home elicited report, performed better on story comprehension (for each 1 point increase on the index, the predicted comprehension score increased by 1.31 answers on average).

Together these predictors accounted for 46 percent of the variation in story comprehension scores. Again there was no interaction between the two predictors, and they were independent (tolerance statistic = .98).

Table 7
Regression Models for Predicting Story Comprehension Task Scores (Predictors at Age 3)

Model	School Pretend ß	Home ER Index ß	R^2	d.f. Error	Increment to R^2
I	.994**	---	.229**	27	---
II	---	1.46**	.192**	35	---
III	.901*	1.31**	.460***	22	.231**

*** $p < .005$
** $p < .01$
* $p < .05$

Predicting formal definitions performance. There was only one age 3 variable that predicted the proportion of definitions the child gave that were formal: the percentage of time spent in pretend talk during preschool. (see Table 8).

Table 8
Regression Model for Percent of Definitions Given as Formal (Predictor at Age 3)

Model	School % Pretend ß	R^2	d.f. Error
I	2.571****	.368****	27

**** $p < .0005$

For each 1 percent increment in proportion of talk that was pretend talk, there is a corresponding 2.57 percent average increase in predicted score on the definitions task. Proportion of pretend talk explains 37 percent of the variation in percent of definitions given that are formal.

Predictors at Age Four

Predicting PPVT. The proportion of mealtime conversation that was narrative and the proportion of mealtime conversation that was explanatory were composited using principal components analysis. This new home predictor reflected the proportion of discourse talk at mealtimes.

Another composite that reflected analytic talk was created from the frequencies of teacher requests and student responses to requests for analysis, discussion of word meanings, and predictions that occurred in the school bookreadings when the target children were age 4.

Together these two predictors accounted for an astonishing 74 percent of the variation in PPVT scores (see Table 9). There was no interaction between the two, and multicollinearity was not a problem (tolerance statistic = .84).

Table 9
Regression Models for Predicting PPVT Scores (Predictors at Age 4)

Model	School BR Analysis ß	Home MT Discourse ß	R^2	d.f. Error	Increment to R^2
I	7.41****	---	.361	28	
II	---	10.50****	.510	18	
III	6.47***	8.20***	.738	15	.228***

**** p < .0005
*** p<.005

From the estimated slopes of the predictors, we see that, controlling for exposure to analysis talk in school bookreading, greater exposure to mealtime discourse predicts higher PPVT scores on average. And, more analysis talk in school bookreading predicts higher PPVT scores on average, controlling for proportion of mealtime discourse talk.

Predicting story comprehension. Three separate variables predicted performance on the story comprehension task, although when placed in models together, none of them added any new explanatory power to the model. This is because the three variables are correlated with each other.

In Table 10, we see that, on average, for each one unit increase in the home bookreading index, there is an average increase of .297 in predicted comprehension score (the scale is 0 to 13). This index explains 24 percent of the variation in story comprehension task performance.

Table 10
Regression Model for Predicting Story Comprehension Task Scores (Predictor at Age 4)

Model	Home BR Index ß	R^2	d.f. Error
I	.297***	.239***	34

*** p < .005

The proportion of narrative talk at home mealtime is also a predictor of story comprehension score. In Table 11, we see that for a 1 percent increase in the home bookreading index, there is an average .166 increase in predicted comprehension score. This index explains 26 percent of the variation in story comprehension task performance.

Table 11
Regression Model for Predicting Story Comprehension Task Scores (Predictor at Age 4)

Model	Home MT % Narrative ß	R^2	d.f. Error
I	.166*	.261*	18

* p < .05

The proportion of analytic talk in school bookreading explains 14 percent of the variation in story comprehension task performance. In Table 12, we see that for each one unit increase in the

composite, there is a .771 increase in predicted comprehension score on average.

Table 12
Regression Model for Predicting Story Comprehension Task Scores (Predictor at Age 4)

Model	School BR Analysis ß	R^2	d.f. Error
I	.771*	.144*	28

* p < .05

So, greater participation by the child in home bookreading, greater proportions of narrative talk at home mealtimes, and greater proportions of thought and analysis talk in school bookreading all (individually) contribute something to the prediction of story comprehension scores.

Predicting formal definitions performance. Again only one variable predicts scores on the definitions task: whether or not bookreading takes place regularly in the school (see Table 13). Children whose teachers read to them regularly scored, on average, 30 percent higher than those whose teachers did not. This predictor accounted for 21 percent of the variation in the percent of formal definitions.

Table 13
Regression Model for Percent of Definitions Given as Formal (Predictor at Age 4)

Model	BR in School? ß	R^2	d.f. Error
I	30.1***	.212***	36

*** p < .005

Discussion

Our results clearly demonstrate the importance of looking across several interactional contexts, as well as over time in order to see links between early experience and later language and literacy development. In several cases, home and school factors together account for variation in children's scores on a range of tasks. In other cases, home or school factors independently account for variability in children's outcomes. What do the patterns observed herein suggest about the relationship between home and school factors and their influence on children's early academic performance?

Vocabulary. At ages three and four, a combination of home and school factors predicted much of the variation in children's PPVT scores. However, the specific predictors varied from one year to the next, suggesting an age-related effect. Both of the predictors during the three-year-old visit are reflective of children's sophistication in language use. The child's non-immediate talk in the home book reading event, either spontaneously produced or produced in response to mother's non-immediate talk, reflects the child's ability to handle such talk. The proportion of time the child spent in pretend play talk during school is independent of adult input, as this talk occurs most often with other children or when the child is alone. These measures of linguistic sophistication at age three predict later vocabulary performance.

During the four-year-old visit, however, both the mealtime discourse predictor (a composite of the proportion of mealtime talk that is narrative or explanatory produced by any

member of the family) and school bookreading analysis predictor (a composite of teacher questions and child responses to questions) are measures of interaction between child and adult. The quality of the talk to which the child is exposed in a particular environment, as well as the child's ability to comprehend and contribute within an interactional context at age four, predicts vocabulary performance at age five. Thus, the predictive power for later vocabulary development shifts between ages three and four from the child's ability to produce more sophisticated language at home and school to richness of talk within the environment at home and school.

Story comprehension. Our results for the Snowy Day story comprehension measure echo those for vocabulary, with several subtle differences between ages three and four. At age three, child language sophistication, measured in terms of the child's contribution to the elicited report at home and the amount of time spent in pretend play at school, predicted scores on our story comprehension measure at five. At age four, both home and school factors showed predictive power, but were independent of each other. Similar to our results for vocabulary development, however, the age four predictors all reflected the quality of talk within the setting in which the child was a co-participant. In the home, the child's overall ability to respond to mother's questions and provide new information spontaneously during bookreading or the proportion of narrative talk during the family's mealtime predicted comprehension at age five. In school, the joint analysis between teachers and children during bookreading predicted comprehension a year later. As with the vocabulary findings, there is an age-related shift in ability to predict the age five outcome measure, from child sophistication at age three to quality of talk within the interactional environment at age four.

Definitions. The patterns described thus far have pointed to the importance of home and school factors for predicting early language and literacy development. In terms of children's ability to define a series of words, however, home factors did not show predictive power. Similar to the previously described age-related trends, however, the pattern for school factors as predictors of children's ability to give formal definitions is retained. Specifically, at age three, the amount of time spent in pretend talk (a measure of child language sophistication) predicted 37 percent of the variance in scores on the definitions task at age five. At age four, a relatively gross measure of the quality of talk children are exposed to, whether or not bookreading occurred regularly, predicted variation in children's scores. The lack of contribution by home factors for this task may suggest that defining words is a typically school task, something learned and practiced within a particular context, and not something that can be generalized from particular home predictors.

Decontextualized Talk

Although the types of talk (e.g., analytic, narrative, pretending, explanatory) and interactional contexts (home, school, bookreading, mealtimes, play time, story telling) described here each contribute differently to children's early language performance across a range of measures, they all share one common feature. As we predicted, the kinds of talk that require children to remove themselves (cognitively and linguistically) from the immediate context of interaction, what we have called decontextualized talk, are essential to the development of literacy and language skills.

When our target children were three years old, home environments which supported their non-immediate comments during book reading and their spontaneous input during an elicited report, and school environments which supported their pretending fostered the children's later performance on our measures. Non-immediate talk during book reading requires the child to move away from the text and analyze it directly. Reporting on some event or telling a story requires the child to convey information about a past event to an audience unfamiliar with the experience. And pretending requires sophisticated planning, negotiation, and role-taking in an abstract interactional context.

When our target children were four years old, their abilities to contribute in a collaborative conversation, either in mealtime or bookreading at home, or during bookreading at school, were

predictive of their scores on our outcome measures. The mealtime narrative and explanatory talk both require communication of novel, non-immediate information. Giving an explanation demands that the speaker make some connection between objects, concepts, ideas, or events clear to a listener. Telling about an event that a person participated in requires the person to talk about another time and another place. The bookreading index also requires a relatively complex level of interaction by the child in which she spontaneous volunteers information about the book. And the analytic talk during school bookreading requires that the child be able to attend to and contribute to prediction and analysis of the text and its vocabulary.

Conclusions. The findings of this study represent a significant contribution to the existing literature on the early language and literacy development of children from low-income families. We have shown the complementary nature of home and school factors as they influence children's early language environments, and have provided a rough sketch of a longitudinal portrait of the way these variables interrelate. We have also traced the path from predominantly child sophistication measures (e.g. contributions during elicited reports and book readings, amount of time spent pretending) to predominantly environmental and interactional factors (e.g. co-constructed discourse during mealtimes and school bookreadings). We have highlighted the similarities across the contexts and types of talk; all require children to distance themselves from the immediate conversational context. Finally, we have articulated the relationships between early language environments in the home and school and children's performance on a range of language and literacy tasks.

Both home and school provide opportunities for the development of children's literacy abilities. Some of these opportunities at home have similar demands to those at school, while others represent a different set of demands. Consequently we see literacy development benefitting from these overlapping and complementary influences of the two settings.

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